Claims

1. A process to produce a formed zeolite for adsorption purposes with improved adsorption and desorption properties comprising the following steps

a) mixing of at least one faujasite zeolite powder, in particular a zeolite 13X powder or a zeolite LSX powder, with a clay type binder, an inorganic phosphorous salt, water and, optionally, with an organic additive

b) production of a formed zeolitic body out of the mixture of step a), and

c) drying and calcination of said zeolitic body produced in step b) to fix the binder and to get the active adsorption reagent.

2. The process of claim 1, comprising after step c) a step of ion exchange.

3. The process of anyone of the preceding claims, wherein the amount of clay binder is between 5 and 30 weight percent of the formed body weight.

4. The process of anyone of the preceding claims, wherein the amount of clay binder is between 5 and 20 weight percent of the formed body weight.

5. The process of anyone of the preceding claims, wherein the zeolite powder is at least 70 % in its sodium form.

6. The process of anyone of the preceding claims, wherein the zeolite powder is at least 90% in its sodium form.

7. The process of anyone of the preceding claims, wherein the zeolite powder is at maximum 30 % in its potassium form.

8. The process of anyone of the preceding claims, wherein a pore forming agent is added to the zeolite and binder mixture, in particular a pore forming agent selected from the group consisting of Rayon fibers, Nylon fibers, Sisal fibers and flax, as well as organic

polymers, such as starch, starch derivatives, ligninsulfonates, polyacrylamides, polyacrylic acids, cellulose and cellulose derivatives.

9. The process of anyone of the preceding claims, wherein the pore forming agent amounts to 2 to 15 weight percent based on the formed body weight.

10. The process of anyone of the preceding claims, wherein the inorganic phosphorous salt used in step b) is a water soluble phosphorous salt, in particular a phosphorous salt selected from the group consisting of tetrasodium diphosphate, tetrasodium polyphosphate, trisodium phosphate, disodium hydrogen phosphate, sodium dihydrogen phosphate, tripotassium phosphate, dipotassium hydrogen phosphate, potassium dihydrogen phosphate or a mixture of two or more of said phosphorous salts.

11. The process of anyone of the preceding claims, where the amount of inorganic phosphorous salt is between 0.3 and 5.0 weight percent based on the formed body weight.

12. The process of anyone of the preceding claims, where the amount of inorganic phosphorous salt is between 0.3 and 3.0 weight percent based on the formed body weight.

13. A zeolitic adsorption compound obtainable according to the process of anyone of the preceding claims.

14. A process to remove by adsorption one or more low molecular weight organic sulfur compounds from a gaseous or liquid stream, wherein the feed stream is passed through a bed of formed zeolitic molecular sieve according to claim 13.

15. The process of claim 14, wherein the organic sulfur compounds are one or more low molecular weight mercaptans or sulfides.

16. The process of claim 14 or 15, wherein the adsorption temperature is at most 60°C.

17. A desorption process for the desorption of organic sulfur compounds from a formed faujasite zeolite, in particular formed zeolite 13X or formed zeolite LSX, or a mixture of formed zeolite 13X and formed zeolite LSX, wherein the desorption is done by a heating profile allowing the organic sulfur compounds to reach their equilibrium adsorption capacity at each temperature.

18. A desorption process, in particular according to claim 17, for the desorption of organic sulfur compounds from a formed faujasite zeolite, in particular formed zeolite 13X or formed zeolite LSX, or a mixture of formed zeolite 13X and formed zeolite LSX, wherein the desorption is done by fast heating to a basic temperature of at most 200°C, preferably 100 to 150°C, in particular about 150°C, and then using a temperature halt at different temperature levels starting at the basic temperature.

19. A process according to claim 18, wherein the halt time is at least 10 minutes at each temperature level.

20. A process according to claim 18 or 19, wherein the temperature levels are at least 5°C and at most 50°C apart from each other.

21. A desorption process, in particular according to claim 17, of organic sulfur compounds from a formed faujasite zeolite, in particular a formed zeolite 13X or formed zeolite LSX, or a mixture of formed zeolite 13X and LSX, wherein the desorption is done by fast heating to a basic temperature of at most 200°C, preferably 100 to 150°C, in particular about 150°C, and then heating using a small temperature increase rate at temperature levels above the basic temperature.

22. A process of claim 21, wherein the temperature increase rate is less than 3°C/min.

23. The process of anyone of claims 17 to 22, wherein the zeolite is a zeolite of claim 13.

24. The process of anyone of claims 17 to 23, wherein the maximum regeneration temperature is about 320°C.

25. The process of anyone of claims 17 to 24, wherein the regeneration gas is a dry natural gas, methane, natural gas liquids, hydrogen, nitrogen or hydrocarbons.